Parallel Virtual Urban Workshops

A "resasonable-cost" methodology for academic internationalization in problem-solving oriented postgraduate subjects

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***Abstract*—New information and communication technologies (ICTs) are offering unprecedented opportunities and challenges for innovating in a collaborative way at the academic and research realm. With the purpose of taking advantage of these opportunities, a project called "Parallel Virtual Workshop (PVW)" has been set in a Master's Program to pursue academic internationalization, to provide professional exposure to students and to develop a multidisciplinary planning methodology. Within PVW, ICTs are used to assemble these goals, while cutting down costs. PVW proposal is described, outcomes are presented, and strengths and weaknesses are discussed. Finally, and since it is an ongoing project, future work is presented. Overall assessment indicates that PVW may become an integrated, efficient and innovative approach to respond to present challenges faced by postgraduate programs that intend to attract an international audience at a reasonable cost.**

Keywords— innovation in education, postgraduate courses; ICTs; academic internationalization; paralell workshop; multidisciplinary approach; neighbourhood regeneration

I. INTRODUCTION AND OBJECTIVES

In the last 10 years, society has experienced an unprecedented access to the internet. In turn, the increasing number of virtual platforms and web-based services has effectively transformed how universities conduct their research (1) and is quickly redefining the way they teach. In many cases, information and communication technologies (ICTs) have rendered material boundaries intangible, thus enabling the development of shared solutions for complex problems, allowing for individual interaction among very distant regions of the world and creating opportunities for multidisciplinary collaboration.

Traditionally, the university was the arena where innovative solutions were produced to be later tested on the real world. Thanks to virtual platforms available to any person, this pattern has been altered. Nevertheless, the academic realm is still far behind in the employment of these innovative tools when compared with technologically driven industries which are at the forefront of developing virtual platforms.

Chris Jones at the introduction of his essay "Networked Learning, Stepping beyond the Net-Generation and Digital Natives" quotes Marc Presnky to exemplify the dramatic change the information technology has brought to everyday life: "The place were the biggest educational changes have come is not our schools, it is elsewhere but our schools" (2). The way public educational institutions and companies conduct their investigations with regards of the usage of innovative technology, multidisciplinary teams and international collaboration has shown a very wide gap until recently.

In the areas of urban design and sustainable urban regeneration, this type of innovative-multidisciplinary-international-collaborative projects has been further constrained by the weight of the local context. In fact, different technical knowledge and expertise or restrictions by local culture and legal framework have imposed a heavy toll on this type of initiatives. This particular setting has hindered the application of innovative technological tools at the post graduate level in certain social science fields, particularly in urban planning and design.

Nowadays, access to international networks is a need, especially daring and valuable for universities at developing and medium size countries. Their benefits in a global world are well known: academics enlarge their scientific knowledge and improve their teaching methodologies, while students benefit from experiencing differences in living, academic programs and cultural background. Especially valuable for them is to understand how similar issues are addressed from different cultural perspectives, professional methodologies and institutional environments. Recognition of these benefits has led to increasing mobility of students and staff as well as to the establishment of joint academic programs, where students move from one country to another, during one or more terms.

To face the above mentioned challenges, the project called "Parallel Virtual Workshop (PVW)" was set by a group of professors at the Department of Urban and Regional Planning, Madrid Technical University (UPM). The PVW project pursues three major goals: (a) achieve academic internationalization based on a virtual network; (b) implement a professional practice approach on regeneration urban projects; and (c) develop a multidisciplinary methodology to handle complex urban problems. The key contribution of this project is the employment of ICTs in an integrated, highly efficient and innovative way to respond the above mentioned challenges.

II. COMPARABLE INTERNATIONAL EXAMPLES

A collaborative research methodology to search for the most suitable response to a given problem has long been accepted as a valid option in technological fields such as engineering, computing, mathematics and biomedicine. Cases of employing virtual platforms for achieving international, collaborative and multidisciplinary research among universities are abundant on academic scientific literature. In fact, some illustrative cases can be presented.

One example is the Human Genome Project (H.G.P.), the world largest international collaborative effort undertaken to identify and analyze all the genes which define the human species. This project included not only research but also some substantial educational tasks, such as lectures (description) and seminar sessions (discussion). This educational initiative, carried out on 2010, was organized by setting collaborative web-based sessions for students in Hungry and Portugal. The first part was presented in four web-based interactive sessions at Semmelweis University in Budapest, faculty of Health Science through the support of a Fulbright Lectureship. The project's second part involved a graduate student workshop at the School of Biotechnology of the Catholic University of Portugal in Porto, supported by the Fulbright Inter-country Lecture Program (3).

Another example is the "Estimating time-varying brain networks" project (2013-2016). An interdisciplinary collaboration lead by the Department of Statistics at Imperial College London under the umbrella of the Human Brain Project (H.B.P.), a research initiative coordinated by the European Research Program. In this case, students could create their own network using the technology. It was a cooperative investigation from the Department of Statistics, Imperial College London, the Cognitive and Clinical Neuroimaging Laboratory, Imperial College London, and the Department of Biomedical Engineering, King's College London in which three students using virtual platforms such as Skype, Dropbox and Github interacted on a weekly basis to follow up and collaborate in the investigation.

Regarding specific examples in the field of urban regeneration, there is an early one, the 'Community Design Studio Program", developed within the UK higher education learning context (2005). The main interest here was the multidisciplinary approach. A collaboration initiative was set between two courses, one in architecture and the other in environmental psychology, to generate a creative dialogue about plans for the renewal of an inner city area in Glasgow (Govanhill). The collaboration took the form of architecture students, as designers and environmental psychology students as consultants, communicating electronically between Guildford (University of Surrey) and Glasgow (University of Strathclyde), and then meeting for on-site project work in London and Glasgow. This interdisciplinary collaboration took place over nine month's period, one academic course. It involved long-distance collaboration through a virtual-studio with limited direct contacts, recreating in the academic grounds the professional multidisciplinary collaboration used in the real world when specific expertise was needed (4)

Another recent case, which involved the University of British Columbia, Canada, and Universidad de Rio Grande, Brazil, is worth considering. This collaborative international project illustrates the interaction with local agents. It was carried out in 2011 to explore the university's potential for helping to build urban governance capacity at the local level, having as guideline the successful transformation from informal settlement to organized neighborhood of the Mãe Luiza community in the City of Natal, Brazil. This project explored possibilities for further action by social agents, governments, and universities to help the community maintain its trajectory toward greater social inclusion. This collaborative international partnership combined on-line learning with traditional in-situ discussions and field work. A consensual set of measures, enriched by each partner's contributions, were put in place (5). The final example is called the Lisbon Strategy (2000-2010), whose main actions were centered on economic, social, and environmental renewal and sustainability, to promote the transition to a knowledge-based economy by moving from research process to learning process (6).

These examples served as a starting point to expand this multilayer methodology and bring in different possibilities from professional practice to the classroom realm.

It must be stated that the use of a virtual platform as a collaborative educational tool opens the possibility to exchange ideas at an even level and to develop innovative approaches to solve a given problem. This approach can also be applied successfully for urban regenerations projects, as this paper will show.

III. PROJECT DEVELOPMENT

PVW started in 2011-2012, and since then, it has been carried out three times: first one Madrid (UPM)-Boston

(MIT)[1], second Madrid (UPM)-London (UCL) on 2012-2013[2] and a third one, again UPM -UCL, is in progress[3].

As stated at the beginning of the paper, PVW is searching for an integrated answer for three challenges: internationalization, professional practice and multidisciplinary approach. The project's aim is to get this sort of input in a more simple and affordable way. Two groups of professors and students of universities located in different countries have to produce quasi-professional solutions to a similar problem in two different sites during an academic semester. It is also essential to produce an integrated methodology among the professors with diverse research interests such as ecology-environment, socio economic-forecasting or urban design-sustainable mobility.

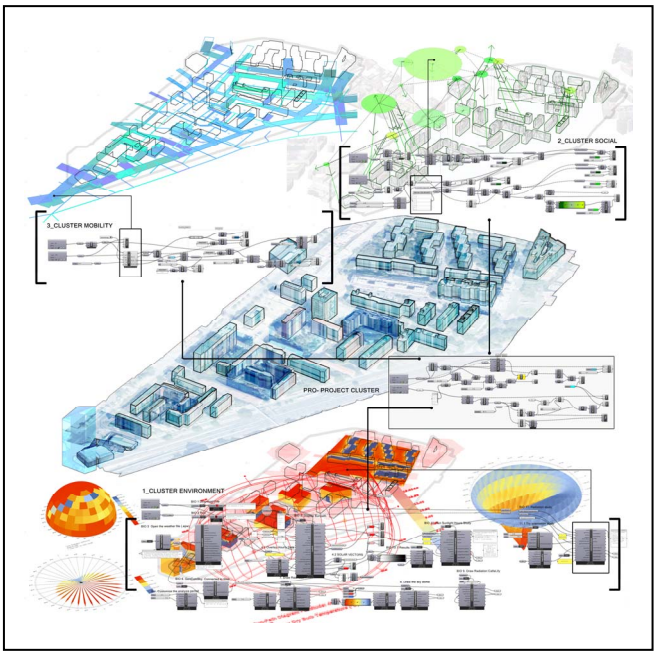

Fig. 1. Main analytical approaches at PVW in Comillas Neighbourhood, Madrid *(Source: Sergio del Castillo)*

The peculiarity of PVW is that any kind of interchange, including life sessions, is based on the use of simple communication technologies. Tools used by PVW are free video call and instant message system (Skype), a virtual platform to download working papers and to provide a friendly communication channel (Dropbox), and a blog for transmitting comments about work in progress, for discussing methods and tools, for exchanging bibliography as well as for assessing analyses and design proposals.

Nevertheless, PVW cannot be a unique answer to the three challenges stated at the beginning. On the contrary, experience has shown that complementary actions are needed to make truly effective the PVW approach. For example, field trips with on-site workshops are highly recommended to make sure that both participant universities share the same analysis and agree on proposed solutions. Podcasts are an effective way to disseminate professors' expertise. Additionally, the exhibition of students work at each university constitutes an opportunity for academic debate with other professors and professionals as well as an incentive to attract new students for successive courses. Just as well, an international design competition has been recently used to boost students' involvement and public participation methods are being implemented with neighbors and stakeholders in order to test and improve proposals.

IV. ASSESSMENT

Though limited, our experience in the last three academic years has showed already some strengths and weaknesses of the PVW approach.

Regarding its strengths, it can be pointed out that:

- PVW methodology is adequately fit for postgraduate courses. Students are mature enough to discuss and develop innovative solutions to real problems in different socio-cultural contexts. Additionally, neighborhood scale seems just right to handle complex problems in a semester's time.
- Persistence in integrating social, economic and environmental analysis under a predetermined spatial context is beginning to pay-off. Along the workshop, students become aware of how important interactions between socioeconomic vectors and the urban fabric are. The dynamic nature of a complex urban context is better understood and project solutions are provided accordingly.
- The low-cost nature of the PVW approach can be very valuable for the education community. The massive use of affordable new technologies, such as Skype, blogs or cloud computing, provides an unprecedented communication and interaction capability. Transmitting large loads of information in real time and at no cost is no longer a problem nowadays.

Besides, the PVW approach also shows some weaknesses:

- There are inherent difficulties to select two comparable neighborhoods from two different socio-cultural contexts. In order to make the two cases comparable, similarities should be noticed (urban problems such as traffic congestion or housing deficits) and differences should be taken into consideration (urban characteristics such as micro climate or population structure). Just as well, some external variables, such as economic recession or social unrest, may render the two cases not comparable. Another obstacle may be the selection of a neighborhood which has not a sufficiently mixed socioeconomic activity so as to make it sustainable in the future. Therefore, urban areas with a single predominant use are not good choices for this kind of workshop.
- Some difficulties arise when trying to integrate methodologies, due to time constraints. Not only

[1] http://duspduyot.mit.edu/
[2] http://www2.aq.upm.es/Departamentos/Urbanismo/blogs/ucl-duyot-parallel-workshop-spring-2013/
[3] http://www2.aq.upm.es/Departamentos/Urbanismo/blogs/urban-networking-workshop/

different sectorial approaches are used but also alternative future scenarios are welcome, which inevitable complicate the whole process.

- Matching of timetables, terms and professors within different universities can be a serious barrier to establishing academic agreements. There is also a limit to the number of universities that can participate in PVW at the same time due to technological constraints during virtual sessions (no more than two for free).
- Finding an appropriate low cost technology is a key element of this initiative and it still requires further development and refinement. Problems frequently arise because of poor and unreliable communication connections. Moreover, security is still an issue when storing and sending large loads of information.

One of future challenges for PVW will be turning the "local-site" weakness into strength. Understanding commonalities (dwelling problems, aged population, health, traffic congestion, environmental problems, etc.) will help to improve identification and understanding of local differences.

Lastly, PVW success greatly depends on the students and professors' interest on the subject. If students are not fully involved in getting to know a foreign context and in developing future solutions under strict sustainability criteria, the workshop will inevitable render poor results.

V. RESULTS AND TRANSFERABILITY

Though PVW evaluation is still to be thoroughly undertaken, our three years of practical experience show that it can be an efficient approach to fulfill internationalization, multidisciplinary and professional exposure goals.

As an international outcome of the PVW project, an urban research network between UCL and UPM is being developed to promote the ex-change of Ph.D. students and to collaborate in R&D projects.

Regarding the multidisciplinary approach, its success can be assessed by the multi-sectoral inputs and contributions made by professors of both universities. Nevertheless, time constraints impose limitations for undertaking in-depth social, economic and environmental analysis.

The design studio formula used in PVW has allowed master students to gain professional exposure by comparing diverse urban cases and by working close to local stakeholders. It is argued that PVW methodology can be applied to other engineering disciplines or subjects, particularly those using problem-solving methodologies and facing different local frameworks.

In brief, results show a great involvement and a high level of satisfaction among participant students and tangible opportunities for creating links among universities and students.

VI. FUTURE WORK

Despite some methodological and technical shortcomings, PVW outcomes have been quite encouraging. Therefore, several actions will be taken in the short and mid-term to improve and further develop this approach.

Firstly, efforts will be made to extend the experience to other countries. So far, previous collaborations have taken place between UPM and US and UK universities. In the coming years, opportunities will be explored with other European and Latin American universities.

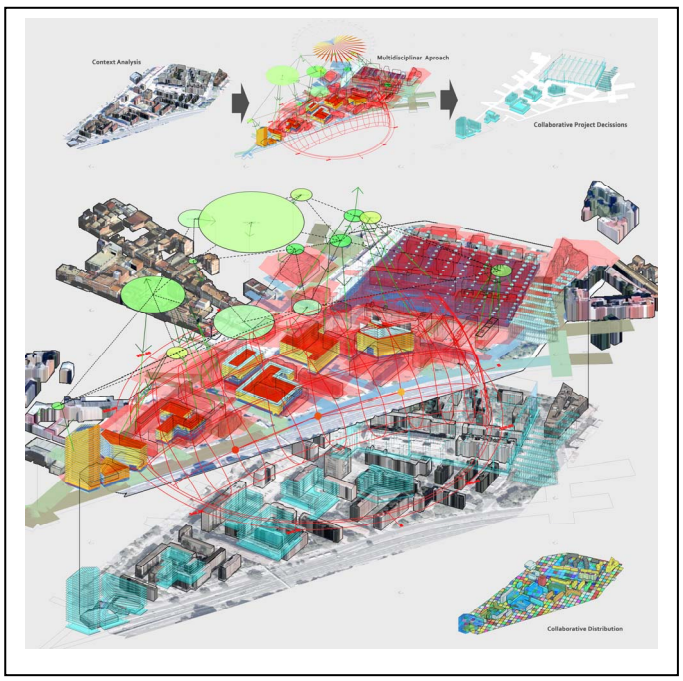

Fig. 2. A possible integrated MDS methodology *(Source: Sergio Castillo)*

Secondly, a pilot program will be developed using Multidisciplinary Design Systems (MDS). This cutting edge project tool will improve the PVW integrated methodology. In fact, MDS will consider the project as a system that integrates different disciplinary and sectorial solutions (environmental, socio-economic, and mobility subsystems).

Thirdly, analytical tools have to be identified to allow cross analysis among different cultural contexts. In other words, PVW needs tools that operate under diverse cultural, political and socioeconomic conditions.

Fourthly, communication tools based on ICTs and physical presentations will have to be refined and adjusted to the demanding needs of PVW. Just as well, ICTs reliability, security and usability will have to be greatly improved.

Lastly, a recently established Educational Innovation Group at UPM, named "URBAN NET-WORKING WORKSHOPS" and run by this article's authors, will be the major driver for improving and developing PVW in the coming years. Hopefully, the mentioned Innovation Group will be the adequate institutional mechanism to capture funding and new international collaborators for this endeavor.

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